UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,162	08/20/2003	Stephen M. Trimberger	X-1393 US	5769

24309   7590   02/07/2007
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EXAMINER
WONG, LUT

ART UNIT	PAPER NUMBER
2129	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
	10/644,162	TRIMBERGER, STEPHEN M.
Office Action Summary	Examiner	Art Unit	
	Lut Wong	2129	.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>20 August 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-33</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-33</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>20 August 2003</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show

every feature of the invention specified in the claims. Therefore, e.g. the program

controller, fitness evaluator, the selector must be shown or the feature(s) canceled from

the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in

reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure

is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next

Office action. The objection to the drawings will not be held in abeyance.

Specification

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are:

In pg. 9 [0026], the spec recites "If there are no inconsistent result signals at block 240, the process continues at block 200 (e.g. , at a selected time, interval or in response to a triggering event, such as a failure)", which means the process continues in response to a failure. It is contradicting to the idea of the invention. The idea should be continue when there is no failure. Applicant is advised to clarify the confusion in the reply.

Claim Objections

Claim 20 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 20 recites "The method of claim 1, wherein generating the associated result signal for each design in the population comprises: programming...; and reprogramming...". The examiner contents that programming and reprogramming has nothing to do with generating result signal. Hence, claim 20 fails to further limit claim 1.

Claim 4 is objected to because of the following informalities: add "determined in

a prior generation" before "includes ..." to make it depends properly from claim 3.

Appropriate correction is required.

Claims 25-33 are objected to because of the following informalities: The

preamble recites "fault-tolerant system", but the claim body does not support/suggest

that it is a fault-tolerant system. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 12, 13, 15, 16, 18, 19, 25-33 are rejected under 35 U.S.C. 112,

second paragraph, as being indefinite for failing to particularly point out and

distinctly claim the subject matter which applicant regards as the invention.

Claim 10 recites "includes determining the associated fitness level as a function of the

difference between the associated result signal of the design and the consensus result,

relative to the difference between the associated result signals of the other designs and

the consensus result." It is not clear what applicant is intended to claim. Whether the

determining of fitness is a function of difference alone? or a relative different compared

with others. It is presumed to meant the fitness level of a design is depend on the

relative fitness for the purpose of compact prosecution.

Claim 12 recites "the method of claim 10, wherein ...". It is not clear whether applicant is intended to mean "the method of claim 1" instead because claim 10 does not recites "wherein selecting for replacement at least one design". It is presumed to mean claim 1, according to the contexts of claim 13-14, for the purpose of compact prosecution.

Claim 13 recites "is a function of a relationship between the associated result signal of the at least one design and the consensus result". It is not clear what kind of relationship is referring to. It is interpreted as "is a output difference between the signal and the consensus", according to [0033], for the purpose of compact prosecution.

Claim 15 recites "wherein randomly selecting at least one design comprises biasing a probability of selecting each design as a function of the associated fitness level". It is not clear how randomly selecting comprises biasing a probability. Claim 15 is interpreted as "The method of claim 1, wherein selecting at least one design comprises using fitness as a biasing to increases the probability of eliminating less-fit designs", in accordance to [0023], for the purpose of compact prosecution.

Claim 16 recites "a relationship between the associated result signal of the design and the consensus result". It is not clear what kind of relationship is referring to. It is interpreted as "output difference between the signal and the consensus", according to [0033], for the purpose of compact prosecution.

Claim 18 recites "The method of claim 1, wherein each of the steps of the method are performed subsequent to an occurrence of at least

one of: reaching a selected time; reaching an end of a predetermined time interval; and

a triggering event". It is not clear whether applicant is intended to claim such limitations

in view of the spec objection.

Claims 25-29 recites "configured and arranged". It is not clear how the controller or

evaluators are "arranged" to do some function.

Any claim not specifically addressed, above, is being rejected as incorporating the

deficiencies of a claim upon which it depends.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3, 13, 15, 16 are rejected under 35 U.S.C. 112, first paragraph, as

failing to comply with the written description requirement. The claim(s) contains

subject matter which was not described in the specification in such a way as to

reasonably convey to one skilled in the relevant art that the inventor(s), at the

time the application was filed, had possession of the claimed invention.

Claim 3: The spec has failed to support that *weighting* the result signal as a

function of the associated fitness level determined *in a prior generation*. Also, the spec

has failed to support how to weight the signal where the signal does not has prior

generation.

Claims 13 and 16 recite "a function of a relationship between the associated

result signal". However, the spec has failed to describe what is the function of a

relationship. The spec, at most suggests output difference from consensus in [0033],

but the spec never mention "as a function of relationship" nor define what is "the

relationship".

Claim 15 recites "wherein randomly selecting at least one design comprises

biasing a probability of selecting each design as a function of the associated fitness

level". The spec has failed to support randomly selecting comprises biasing a

probability. The spec, at most suggests fitness maybe used as a bias to increase the

probability of eliminating less-fit designs at [0023].

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
conditions and requirements of this title,

Claims 1-33 are rejected under 35 U.S.C 101 because the claimed invention

is directed to non-statutory subject matter,

The claims fail to provide a tangible result, and there must be a practical

application, by either

1) transforming (physical thing) or

2) by having the FINAL RESULT (not the steps) achieve or produce

      a useful (specific, substantial, AND credible),

      concrete (substantially repeatable/non-unpredictable), AND

tangible (real world/non-abstract) result.

A claim that is so broad that it reads on both statutory and non-statutory subject matter must be amended. If the specification discloses a practical application but the claim is broader than the disclosure such that it does not require the practical application, then the claim must be amended. A claim that recites a computer that solely calculates a mathematical formula is not statutory.

In the present case, **claims 1-20** are drawn to a method for operating a system. Such method merely select and replace a design based on fitness function, and is considered as abstract idea that merely manipulates data. Such, in and of itself, is not believed to be directed to a practical application which produces a useful, concrete and tangible result. While the practical application does not necessarily need to be recited in the claims, the claims in this instance appear to be directed to a process too preliminary to convey any practical application to one of ordinary skill in the pertinent art. **Claims 21-24** are likewise, drawn to a method for evolving a population of designs. It is also considered as abstract idea that lacks concrete, tangible and useful results. **Claims 25-33** are likewise drawn to a fault tolerant system that select and replace a design based on fitness function. It is also considered as abstract idea that lacks concrete, tangible and useful results.

The courts have also held that a claim may not preempt ideas, laws of nature or natural phenomena. The concern over preemption was expressed as early as 1852. See Le Roy v. Tatham, 55 U.S. (14 How.) 156, 175 (1852) ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one

can claim in either of them an exclusive right."); <u>Funk Bros. Seed Co. v. Kalo Inoculant</u>

<u>Co.</u>, 333 U.S. 127, 132, 76 USPQ 280, 282 (1948).

Accordingly, one may not patent every "substantial practical application" of an

idea, law of nature or natural phenomena because such a patent "in practical effect

would be a patent on the [idea, law of nature or natural phenomena] itself." "Here the

"process" claim is so abstract and sweeping as to cover both known and unknown uses

of the BCD to pure-binary conversion. The end use may (1) vary from the operation of a

train to verification of drivers' licenses to researching the law books for precedents and

(2) be performed through any existing machinery or future-devised machinery or without

any apparatus." <u>Gottschalk v. Benson</u>, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-17, 21-24 are rejected under 35 U.S.C. 102(e) as anticipated by

Buczak et al (US 2003/0050902). See at least, abstract, background, summary,

figures, [0037-0049] and claims. Examiner Notes (EN) and related citations are

denoted in parenthesis.

Claims 1, 21 and 24:

Buczak anticipates a method for operating a system having a population of

designs, each design being adaptable for use in operating the system (genetic

algorithms and optimizing evolvable hardware. See e.g. [0002]-[0005]), the method

comprising: in response to an input signal, for each design in the population, generating

an associated result signal (sensor signals. See e.g. [0012]-[0016], [0031]-[0036]

especially [0035]); determining a consensus result as a function of at least two of the

generated result signals (has convergence criteria been achieved. See e.g. Fig. 2-160

and [0047]. *EN: The examiner interprets consensus as agreement has been reach,*

such as when there is no change in the population fitness, or the fitness of an individual

reaches a fitness value.); determining an associated fitness level of each design as a

function of the associated result signal and the consensus result (determining fitness of

population. See e.g. [0046] and Fig. 2-160); selecting for replacement at least one

design as a function of the associated fitness level (selecting fittest for reproduction.

See e.g. Fig. 2 and [0048]. *EN: this is the same as eliminating weak designs*); evolving

a new design from at least one design in the population; and replacing the design

selected for replacement with the new design (creation of the offspring. See e.g. [0049]

and Fig. 2-180).

Claims 2-4: Buczak anticipates weighting as a function of a number of generations in

which the associated design has been a member of the population (See [0061] the king

genetic algorithm where the fittest individual is always chosen for mating. EN: hence

the fittest individual gets more weight/chance because it remains in the population more

often.)

Claim 5: Note that the determining a consensus result includes accumulating result

signals from each of the designs over a period of time (accumulating sensing signals

and convergent criteria. See e.g. [0036] and [0047]).

Claim 6: Note that the determining a consensus result includes determining a statistical

result of the at least two of the generated result signals (converge if no change in fitness

after some number of generations. See e.g. [0047]. EN: hence, the delta is the

statistical result).

Claim 7: Note that the consensus result is outputted (See e.g. Fig. 2-185 and [0047]).

Claim 8: Note that the method further comprising selecting at least one of the designs

to generate an output for use in operating the system (See e.g. Fig. 2-185 and [0047]).

Claim 9: Note that the determining includes comparing the associated result signal

(comparing the fitness with some fitness function. See e.g. [0046]).

Claim 10: Note that the fitness level of a design is depended on the relative fitness (the

term "fittest" implies it's a relative measure. See e.g. [0046]).

Claim 11: Note that the fitness level is determined by a bitwise difference of the signals (See e.g. [0040]. *EN: it is also inherent because all data are represented as bit/byte in computer. Hence, the comparison are bitwise difference*)

Claim 12: Note that selecting for replacement at least one design comprises selecting a design having the greatest difference between the associated result signal of the design and the consensus result (selecting n-1 fittest for reproduction. See e.g. Fig. 2 and [0048]. *EN: this is the same as eliminating the weakest design*).

Claim 13: Note that selecting for replacement the at least one design is a output difference between the signal and the consensus (the one with lowest fitness value. See e.g. [0046])

Claim 14: Note that selecting for replacement the at least one design comprises randomly selecting at least one design (random selection. See e.g. [0048]).

Claim 15: Note that selecting at least one design comprises using fitness as a biasing to increases the probability of eliminating less-fit designs (biased roulette wheel. See e.g. [0048]).

Claim 16: Note that the weighting is at least one of: the number of generations in which the design has been a member of the population (king GA. See e.g. [0061]), output difference between the signal and the consensus (fitness. See e.g. [0048]), and a probability function (random. See e.g. [0048]).

Claim 17: Note that prior to generating an associated result signal, further comprising: evolving a preliminary population of designs by determining an associated fitness level of each design in the preliminary population as a function of fixed evaluation criteria (initial population and fitness criteria. See e.g. Fig. 2 and [0044]-[0046]); and in response to satisfaction of selected completion criteria, ceasing evolving the preliminary population of designs and storing the preliminary population of designs as said population of designs from which the associated result signals are generated (starting the evolution process. See e.g. Fig. 2.)

Claim 22: Note that the consensus result are a function of associated fitness characteristics of the plurality of designs (has convergence criteria been achieved. See e.g. Fig. 2-160 and [0047]).

Claim 23: Note that the consensus result includes assigning weight to each of the associated result signals (the king GA. See e.g. [0061]).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 25-28, 30-33 are rejected under 35 U.S.C. 102(a) as being anticipated

by Lohn et al ("Evolvable Systems for Space Applications" SMC-IT 2003, July 13-

16). See at least, section 2.1 and 3. Examiner Notes (EN) and related citations are

denoted in parenthesis.

Claims 25 and 32: Lohn et al anticipates a fault-tolerant system comprising: a

programmable device programmable with at least one of a plurality of designs, each

design being adapted to generate an associated result signal in response to an input

signal (FPGA and fault recovery. See e.g. section 3); a fitness evaluator (fitness

function. See e.g. section 2.1) configured and arranged to determine a consensus

result as a function of associated result signals from at least two of the plurality of

designs and to determine an associated fitness level of each design of the plurality as a

function of the associated result signals and the consensus result; and a selector

configured (tournament selection. See e.g. section 2.1) and arranged to select and

replace one of the plurality of designs with a new design as a function of the associated

fitness level of the selected

design.

Claim 26: Note that the system further comprise a evolution controller (produce a child. See e.g. section 2.1) configured and arranged to generate the new design from a plurality of the designs.

Claim 27: Note that the fitness evaluator is further configured and arranged to select at least one of the plurality of designs for implementation in an operational device (evolving alternative logic configurations. See e.g. section 3).

Claim 28: Note that the fitness evaluator is configured and arranged to determine an associated fitness level of a design exhibiting a fault, the associated fitness level being indicative of the fault, and wherein the selector is configured and arranged to select and replace the design exhibiting the fault as a function of said design's associated fitness level (fault Recovery and evolving alternative logic configuration. See e.g. Fig. 3).

Claim 30: Note that the programmable device includes a programmable logic device (FPGA. See section 3).

Claim 31: Note that the programmable device includes a microprocessor (See e.g. Fig. 9. *EN: also inherent that a programmable device must have a microprocessor*).

Claim 33: Note that the fault-tolerant system further comprising a memory for storing at least one of the plurality of designs (See e.g. Fig. 9. *EN: also inherent that a fault-tolerant system must have memory storage*).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lohn et al ("Evolvable Systems for Space Applications" SMC-IT 2003, July 13-16), and official notice. Examiner Notes (EN) and related citations are denoted in parenthesis.

Claim 29: Lohn teaches evolving alternative logic configurations. (See section 3). Lohn fails to particularly call for sequentially program the programmable device with one design at a time. The examiner takes official notice that sequential programming is well known in the art. One would have been motivated to do so because doing sequential programming can test individual function/behavior.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lut Wong whose telephone number is (571) 270-1123.

The examiner can normally be reached on M-F 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vincent David can be reached on (571) 272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lut Wong
Patent Examiner 2129
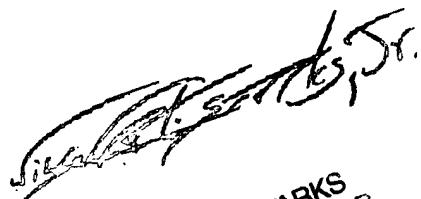
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